International Journal of Anatomy and Research,
Int J Anat Res 2018, Vol 6(2.2):5268-71. ISSN 2321-4287
DOI: https://dx.doi.org/10.16965/ijar.2018.177

Original Research Article

ANATOMICAL VARIATION OF TESTICULAR VEINS AND ITS EMBRYOLOGICAL IMPORTANCE

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ABSTRACT

Introduction: Normally testes are drained by testicular veins. About 15 – 20 veins appear on the posterior border of testes and epididymis which unite to form the pampiniform plexus. Right testicular vein drains directly into inferior vena cava whereas left testicular vein drains into left renal vein [1]. These veins have much variation which includes in number, course & termination.

Aim: To study the anatomical variation in termination of testicular veins.

Materials and Method: Study was conducted in 30 cadavers by regular dissection to analyze the variation in number and termination.

Result: In the present study, testicular vein was normal in number and termination in 26(86%) cases. In remaining cases, variation was observed in the form of duplication of testicular vein in 1(3.33%) of the cadavers and variation in termination was seen in 3(6.67%) of the cadavers.

Conclusion: Awareness about these variations will be helpful during surgical procedures.

Key words: Testicular vein, Variation, Duplication.

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Access this Article online	Journal Information
Quick Response code	**International Journal of Anatomy and Research**
	ICV for 2016 90.30
	ISSN (E) 2321-4287 | ISSN (P) 2321-8967
	https://www.ijmhr.org/ijar.htm
	DOI-Prefix: https://dx.doi.org/10.16965/ijar
DOI: 10.16965/ijar.2018.177	**Article Information**
	Received: 05 Mar 2018 Accepted: 05 Apr 2018
	Peer Review: 06 Mar 2018 Published (O): 05 May 2018
	Revised: None Published (P): 05 May 2018

INTRODUCTION

Normally testes are drained by testicular veins. About 15 – 20 veins appear on the posterior border of testes and epididymis which unite to form the pampiniform plexus. Right testicular vein drains directly into inferior vena cava whereas left testicular vein drains into left renal vein [1]. Differences in termination of testicular veins are due to anomalies which occur during development [2]. The main aim of this study is to analyze the anatomical variation with respect to number and site of termination. Moreover an effort is done to note the presence of such variations which may be due to developmental abnormalities.

Testicular veins are formed from sub-cardinal veins. Former results due to change of anastomotic pattern among, supra-cardinal, sub-cardinal and post -cardinal veins[3-5]. The Testicular vein presents much variation in site of drainage, which may lead to the various clinical conditions affecting the testes, other pelvic diseases. Furthermore, there is a dearth of evidence in the literature regarding differ-

ences in termination of testicular veins. Hence terminations of the testicular veins were studied. About 30 cadavers were included in the study and variations were observed. The purpose of this study is to provide awareness about difference in terminations during invasive procedures due to advancement of new surgical procedures for abdominal and retroperitoneal diseases especially in case of laparoscopic procedures.

MATERIALS AND METHODS

Dissection was conducted in adult embalmed cadavers to first M.B.B.S students in Department of Anatomy of Al-Azhar Medical College, Thodupuzha, Kerala.

Exclusion criteria: Cadavers which have operated for any abdominal of pelvic procedures were excluded from the study due to excessive adhesions.

RESULTS AND DISCUSSION

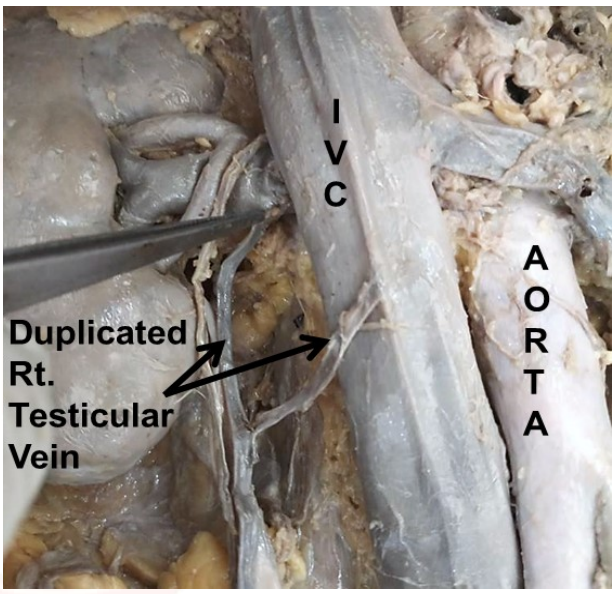
Study was conducted for about 2 years. Fine dissection was carried out in posterior abdominal wall and the testicular vein was traced from deep inguinal ring till its termination on both the sides. Right testicular vein drains directly into inferior vena cava whereas left testicular vein drains into left renal vein [1,6]. In about 30 cadavers studied, 26 cadavers had normal pattern of draining of testicular veins bilaterally. In 1 cadaver, there was a duplication of right testicular vein which instead draining directly into inferior vena cava, it bifurcated and drained into both IVC and right renal vein as a tributary of both the veins (Figure 1) but left testicular vein had usual termination into left renal vein.

Embryological basis behind these type of duplication occurs due to persistence of communication between sub-supra-cardinal and stem of right internal spermatic vein [6,7]. The development of gonadal vein is closely related to the development of renal vein and inferior vena cava.

The development of testicular veins includes anastomosis, obliteration and establishment of three pairs of venous channels which are the supra-cardinal, sub-cardinal and posterior cardinal. Anastomosis between the supra-cardinal and the sub-cardinal veins, takes place on both the sides to form the renal portion of inferior vena cava [11].

Testicular vein develops from distal part of sub-cardinal vein and it anastomosis with the supra-sub-cardinal. Whereas on the right, supra-sub cardinal anastomosis and a little portion of sub-cardinal veins contributes the formation of inferior vena cava, hence the right testicular vein drains into the Inferior vena cava. But on the left side, the supra-sub cardinal anastomosis contributes formation of the major part of left renal vein so the left testicular vein drains into left renal vein [12].

Fig. 1: Duplication of right testicular vein.

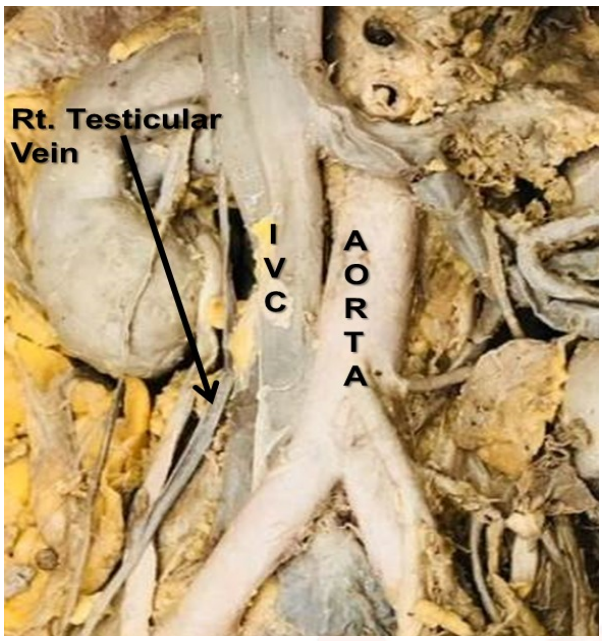


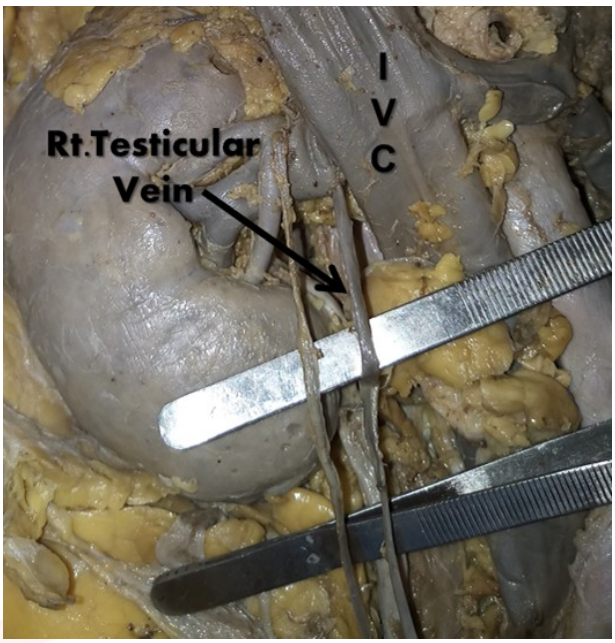
In about 3 cadavers, there was variation in termination of right testicular vein into right renal vein as its tributary instead of inferior vena cava (Figure 2 & 3) but left testicular vein had usual termination into left renal vein. This occurs due existences of sub-supra-cardinal anastomosis.

The anastomosis between the sub-cardinal veins forms the left renal vein. When this communication has been established, the left sub-cardinal vein disappears, and only its distal portion remains as the left gonadal vein. Hence the right sub-cardinal vein becomes the main drainage channel and develops into the renal segment of the inferior vena cava. The anastomosis between the sacro-cardinal veins forms the left common iliac vein [8].

The right sacro-cardinal vein becomes the sacro-cardinal segment of the inferior vena cava. When the renal segment of the inferior vena cava joins with the hepatic segment, which is derived from

Fig. 2 & 3: Draining of Rt. testicular vein into Rt.renal vein.





the right vitelline vein, the inferior vena cava consists of all three hepatic, renal, and sacrocardinal segments.[8].

Similar cases of bifurcated testicular veins on the left side was seen in 8% of cases [9]. In another study both the right and the left testicular veins drained into the left renal vein. In such cases the left testicular vein was one of the tributary of left renal vein [9-10].Such variation will attribute to high risk during abdominal and retroperitoneal surgeries.

In another study, two right testicular veins were seen which drained in the right renal vein and inferior vena cava and on the left side the left testicular vein drained in the left renal vein and the caudal part of the Inferior vena cava [13].

According to one author, testicular vein on the right side originates from distal part of the right sub cardinal vein. The bifurcation of the right testicular vein near the termination may be because of bifurcation of the right sub cardinal vein, during embryogenesis [14].

Similar to above studies, one author has studied about the gonadal veins in 120 cadavers and observed that 97% were normal and in 3% of cases had double right testicular veins which drained into right renal vein [15].

CONCLUSION

The present study was undertaken in view of bilateral testicular vein variations and it was observed that there was difference in drainage pattern only in right testicular vein. These variations may go undiagnosed until it is encountered during surgeries, radiological interventions, autopsies or during dissection in Department of Anatomy. These abnormalities in individuals may increase the incidence of varicocele, infertility, etc. Hence his study was undertaken to through light on embryological errors of testicular veins and the knowledge about the variation of testicular veins may avoid intra-operative and post-operative complications in patients.

Conflicts of Interests: **None**

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How to cite this article:

Kailash Balkund, K. Praveen. ANATOMICAL VARIATION OF TESTICULAR VEINS AND ITS EMBRYOLOGICAL IMPORTANCE. Int J Anat Res 2018;6(2.2):5268-5271. **DOI:** 10.16965/ijar.2018.177